

Serial No.: 09/457,434 Filed: 12/07/1999
Amendment dated: July 15, 2003
Reply to Office Action of: June 3, 2003
Atty. Docket No.: HEN-9910 (P1998J107)

REMARKS

Claim 1 has been amended to include the limitation that the process consists essentially of the process steps outlined therein. No New matter was added.

Claim 1 has also been amended to reflect the fact that the feedstock referred to in line 1 of step (a) is the previously hydrotreated feedstock referred to in the preamble of claim 1. No new matter has been added.

Applicants request that the Examiner enter amended claim 1 in order to place this application in condition for allowance or in better form for appeal.

REJECTION UNDER 35 U.S.C. 103(a)

Claims 1-11 have been rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent Number 5,114,562, Haun et al. ("Haun").

EXAMINER'S POSITION

It is the Examiner's position that Haun teaches a mineral oil conversion process that includes hydrodesulfurization and hydrogenation steps performed in separate reaction zone. The Examiner states that the subject invention specifically relates to the hydrogenation of distillate petroleum fractions to produce low sulfur content products including diesel and jet fuel and that the feedstock can include virtually any middle distillate. The Examiner states that while Haun differs from the instantly claimed invention in that Haun does not show a cocurrent flow of hydrogen and hydrocarbons through the reaction zones. The Examiner states that while Haun differs from the instantly claimed invention in that Haun does not show a process wherein the stripping gas is the vapor phase product from a second reaction stage, the process of Haun et al is not limited to this manner of operation. The Examiner continues that a hydrogen-rich gas

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may flow countercurrent to the liquid-phase hydrocarbons through one or more reaction zones. The Examiner takes the position that it would have been obvious to one having ordinary skill in the art at the time the invention was made to use at least some of the vapor product from the second reaction stage as a stripping gas because Haun et al teach that the stripping gas and vapor phase product are both "hydrogen rich" gases.

APPLICANTS' POSITION

Applicants respectfully disagree with the Examiner. It is applicants' position that one having ordinary skill in the art and knowledge of Haun at the time the invention was made would not have found it obvious to arrive at the presently claimed invention.

The Examiner has considered applicants' arguments in the communication entitled "Response to First Office Action after Request for Continued Examination", but found these arguments lacked merit. Specifically, the Examiner states that applicants' claims did not exclude a recycle stream as taught by Haun because a recycle stream is not a product stream. The Examiner also stated that applicants' use of the word "comprising" as a transitional phrase did not exclude adding fresh hydrogen to a stripping zone or the use of the vapor exiting the stripping zone anywhere in the instantly claimed processing scheme.

As amended in the communication entitled "Response to First Office Action after Request for Continued Examination", the instant invention requires that the hydrogen-containing treat gas cascaded from the second reaction zone comprise the entire vapor product from the second reaction zone. While the Examiner contends that a recycle stream is not a product stream and is thus not excluded by the instantly claimed invention, applicants respectfully disagree. In a reaction such as hydrodesulfurization, two "streams" are produced by the reaction occurring therein, a liquid product and a vapor product. Therefore, a recycle stream around that reactor would necessarily have to

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encompass a portion of one of the reaction products. In Haun, this recycle loop necessarily involves a portion of the vapor reaction product because Haun teaches a vapor recycle loop. Thus, the use of "all of the vapor product exiting the second reaction zone" as the stripping gas in the first reaction stage of the instantly claimed invention necessarily excludes the use of a vapor recycle loop around the second reactor of the instantly claimed invention.

Thus, applicants again submit that Haun does not teach this process configuration. Haun teaches that "A first portion of the hydrogen recovered from the second zone is recycled to the second zone", and "a second portion is passed to the first (desulfurization) zone." See Haun, col. 5, lines 13-21. Haun does not teach that its process can operate without recycling a portion of the gas from the second reaction zone to the second reaction zone. Haun teaches that "preferably from about 35 to 70 volume percent of this gas recovered from the second reaction zone, is passed to the first reaction zone... A remaining second portion is admixed with the gas of line 18 and passed into the treating zone for hydrogen sulfide removal." See Haun, col. 8, lines 18-25. It should be noted that this is an incorrect reference in the Haun patent since the line carrying this gas is given reference numeral 33 and reference numeral 18 denotes the vapors leaving separator 17. Line 18(33) of Haun is mixed with the vapor exiting separator 17 and is treated to remove H_2S in unit 21; this stream, line 22, is then mixed with the feed to reactor 23, the second reaction zone. See the Haun Figure. Thus, Haun teaches a recycle loop for the hydrogen gas used therein around the second reaction zone.

Further, Haun teaches that the liquid product resulting from the first reaction stage must be stripped in a stripping zone, denoted by reference numeral 12 in the Haun Figure. It is within this stripping zone that the fresh hydrogen for the Haun process is added. The stripping vapor containing this hydrogen is then separated in separator 17 and mixed with

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the portion of the vapor from the second reaction zone being recycled to the second reaction zone.

Contrary to the teachings of Haun, the fresh hydrogen-containing treat gas used in the instantly claimed invention is introduced into the second reaction stage not a stripping zone. The present invention gains further efficiency by not requiring recycle of treat gas. See page 9, first paragraph of the instant invention.

Further, the instant invention claims the use of once-through hydrogen-containing treat gas, which is cascaded from the second reaction zone. This once-through hydrogen containing treat gas comprises all of the vapor product exiting the second reaction zone. None of the vapor exiting the second reaction zone is used within a recycle loop around the second reaction zone as taught by Haun. The introduction of the fresh hydrogen-containing treat gas directly into the second stage reactor allows the second stage reactor "to be operated more efficiently owing to a reduction in the activity suppression on the catalyst exerted by H_2S and NH_3 and an increase in H_2 partial pressure." See page 9, first paragraph of the instant specification. The present invention also operates more efficiently by not requiring recycle of treat gas. See page 9, first paragraph of the instant invention.

It should also be noted that the instant invention is concerned with hydroprocessing of a hydrotreated distillate feedstock, as noted in the preamble to claim 1. This is neither taught nor suggested in Haun. The use of a previously hydrotreated distillate allows the instant invention to operate with relatively low treat gas rates.

Thus, it is applicants' position that Haun does not obviate the instantly claimed invention. Haun does not teach the use of once-through hydrogen-containing treat gas. On the contrary, Haun teaches a recycle loop around the second reactor disclosed therein.

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Also, Haun does not teach the addition of fresh hydrogen directly into the second reaction zone as presently claimed. Instead, Haun teaches to add fresh hydrogen into a stripping zone and use the vapor from the stripping zone, after H₂S removal and pressurization, along with a portion of the vapor product from the second reaction zone, as the treat gas in the second reaction zone. Haun also does not contemplate the use of a previously hydrotreated feedstock.

Also, as amended, instant claim 1 utilizes the transitional phrase "consisting essentially of" instead of "comprising". This transitional phrase is defined at MPEP 2111.03, citing In re Herz, 537 F.2d 549, 551, 552, 190 USPQ 461, 463 (CCPA 1976), as limiting the scope of a claim to the specified materials or steps and those that do not materially affect the basic and novel characteristics of the claimed invention.

It is applicants' position that a process that utilizes hydrogen treat gas from a stripping zone would also materially alter the instantly claimed invention. As stated on page 8 - page 9 of the instant specification, "the introduction of clean treat gas (gas substantially free of H₂S and NH₃) allows reaction stage R2 to be operated more efficiently owing to a reduction in the activity suppression effects in the catalyst exerted by H₂S and NH₃ and an increase in H₂ partial pressure"

It is further applicants' position that the inclusion of a recycle loop around the second reactor of the presently claimed invention would materially alter the instantly claimed process. As stated above, the lack of a recycle loop allows the present invention to gain further efficiency. See page 9, first paragraph of the instant specification.

It is also applicants' position that the use of a feedstock that has not been previously hydrotreated would materially alter the instantly claimed invention also. As

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stated above, the use of a previously hydrotreated feedstock allows the instant invention to operate with relatively low treat gas rates.

The Examiner is requested to reconsider and withdraw this rejection.

Based on the preceding arguments and amendments, the Examiner is requested to reconsider and withdraw all rejections and pass this application to allowance. The Examiner is encouraged to contact applicants' attorney should the Examiner wish to discuss this application further.

Respectfully submitted:

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